

3.3 Quads in the Real World :

1. Artem decides to throw a snowball from the top of the portable roof. The graph represents the height of the snowball, as it leaves Artem's hand, over time in seconds.



- What is the initial height of the snowball? _____
 - What is the maximum height of the snowball? _____
When is the snowball at it's maximum height? _____
 - How much higher off the ground was the snowball than Artem's hand, when the snow ball was at it's maximum height? _____
 - How long was the snowball in the air? _____
 - What is the snowball's height at 1 second? _____
 - When is the snowball at that height again? _____
 - Create an Equation that models the path of the snowball
2. A soccer ball was kicked and followed the path given by the equation $h(t) = -(t - 2.5)^2 + 6.5$ where h is height in m, and t is time in seconds.
- Model the situation graphically
 - From what height is the ball kicked?
 - When does the ball hit the ground?
 - State the Domain and Range for this model.
 - What is the height 2 seconds after it is kicked?
 - When will it be at this height again?
3. The parabolic shape of the Humbor River Pedestrian Bridge in Toronto can be approximated by the equation $h(d) = \frac{-1}{144}(d - 60)^2 + 25$, where d is the horizontal distance, in metres, from one end and $h(d)$ is the height in metres, above the water.
- Model the situation graphically
 - What is the maximum height of the bridge?
 - At what horizontal distance does it reach that height?
 - Identify the axis of symmetry of the bridge.
 - How wide is the bridge at its base?
 - What is the height of the bridge 12 m horizontally from one end?
 - When is it at that height again?
4. A golf ball was hit and followed the path given by the equation $h(t) = -4.9t(t - 6)$ where h is height in m, and t is time in seconds.
- Model the situation graphically
 - From what height is the ball hit?
 - When does the ball hit the ground?
 - State the Domain and Range for this model.
 - What is the height 1 second after it is hit?
 - When will it be at this height again?

Answers:

1a) 16 ft b) 25 ft ; 3 sec c) 9 ft d) 8 sec e) 21 ft f) 5 sec g) $h(t) = -(t - 3)^2 + 25$

2b) 0.25m c) approx 5.04 sec d) $D = \{t \in R / 0 \leq t \leq 5.04\}$ $R = \{h(t) \in R / 0 \leq h(t) \leq 6.5\}$ e) 6.25 m f) 3 sec.

3. b) 25m c) 60m d) $d = 60$ e) 120m f) 9m g) 108m 4. b) 0 m c) 6 m d) $D = \{t \in R / 0 \leq t \leq 6\}$
 $R = \{h(t) \in R / 0 \leq h(t) \leq 44.1\}$ e) 24.5m f) 5 sec